FOLU China
Action Agenda

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The Food and Land Use Coalition
China Country Platform

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The Food and Land Use Coalition
China Country Platform

The Food and Land Use Coalition (FOLU) is a global community of country platforms, partner organizations and Ambassadors working to advance sustainability, equity and resilience in food and land use systems. Created in 2017, FOLU supports diversity, embraces disruptive thinking and forges consensus through an evidence-based approach. The coalition empowers farmers, policymakers, businesses, investors and civil society to unlock collective action at scale.

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World Resources Institute is a global research organization that turns big ideas into action at the nexus of environment, economic opportunity and human well-being.

Acronyms

AFOLU	Agriculture, food and other land use
AGFEP	Academy of Global Food Economics and Policy
APEC	Asia-Pacific Economic Cooperation
ASEAN	Association of Southeast Asian Nations
BRI	Belt and Road Initiative
CAAS	Chinese Academy of Agricultural Sciences
CAS	Chinese Academy of Sciences
CAU	China Agricultural University
CBD	Convention on Biological Diversity
CBIRC	China Banking and Insurance Regulatory Commission
CCICED	The China Centre for International Cooperation on Environment and Development
CIDCA	China International Development Cooperation Agency
CO_2	Carbon dioxide
COP	Conference of Parties (to a United Nations Convention)
CH_4	Methane
CTWPDA	China Timber & Wood Products Distribution Association
FACT	Forest, Agriculture and Commodity Trade Dialogue
FECO	The Foreign Environment Cooperation Centre
FOLU	Food and Land Use Coalition
FYP	Five Year Plan
GDP	Gross domestic product
GEI	Global Environmental Institute
GHGs	Greenhouse gases
JRT	Just Rural Transition initiative
LULUCF	Land use, land-use change and forestry
MARA	Ministry of Agriculture and Rural Affairs
MEE	Ministry of Ecology and Environment
MIIT	Ministry of Industry and Information Technology
MOFCOM	Ministry of Commerce
MOST	Ministry of Science and Technology
MT	Million tons
N_2O	Nitrous oxide
NAPCC	National Action Plan of Crop Conservation
NBS	Nature-based solutions
NCDs	Non-communicable diseases
NDC	Nationally Determined Contribution
NDRC	National Development and Reform Commission
NGOs	Non-governmental organisations
PBF	Partnership on Biodiversity and Finance
PKU	Peking University
RCRE	Research Centre for Rural Economy
RCEP	Regional Comprehensive Economic Partnership
SAMR	State Administration for Market Regulation
SPS	Special Policy Study
TFA	Tropical Forest Alliance
TNC	The Nature Conservancy
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States dollar
WBCSD	World Business Council for Sustainable Development
WRI	World Resources Institute

Executive Summary

This Action Agenda is intended to guide the strategies and activities of the Food and Land Use Coalition (FOLU) country platform in China covering the period 2023-2025. Our vision is that by 2030, China's food and land use systems enhance food security, reduce greenhouse gas (GHG) emissions, promote sustainable economic development, and deliver positive outcomes for human and planetary health.

Our approach is to ensure this transformation agenda is deeply rooted in China's existing national priorities, the priorities of the FOLU network, as well as those of key stakeholders in China. China's long-standing focus on food security; its recent commitments to carbon neutrality; and its policy priorities around common prosperity, nutrition, agriculture, rural revitalization, food loss and waste, ecological civilization, green finance and trade, all provide important entry points.

The imperative to transform food and land use systems is becoming increasingly urgent and evident. After decades of progress in reducing hunger, improving livelihoods and increasing yields of key staple crops, there are growing challenges from climate change, soil degradation, biodiversity loss, water pollution, pandemics and wider conflicts. Food security is once more topping the political agenda around the world, particularly in light of the spike in food prices.

In China, there is a growing recognition that these intertwined challenges will require significant and concerted efforts through policies, investments and innovation. Providing adequate, affordable food to China's 1.4 billion citizens has long been a challenge, considering that China has less than 9% of the world's cropland[1] and a third of the global average available freshwater on a per capita basis.[2] Trade is now an essential element for China's food security, but poses new risks in the face of supply chain disruptions.

While increased prosperity, market reform and trade have significantly improved and diversified Chinese diets in recent decades, a new form of malnutrition is rapidly on the rise. Increased consumption of unhealthy foods has contributed to an obesity epidemic. Non-communicable diseases (NCDs) such as diabetes, cancer and heart disease now place an enormous burden on China's health system. Government policies and social campaigns are focused on improving diets, and Chinese consumers themselves are becoming increasingly interested in the quality and safety of food, as well as healthy and sustainable diets.

Out of China's 230 million farmers, 210 million operate on less than 0.67 ha of cultivated land.[3] Many of these farmers are struggling with poor productivity and profitability. Years of unsustainable farming practices have damaged agroecosystems. Challenges include poor soil health, water pollution, a shrinking rural labour force, trade disruptions and climate change. Shifting to sustainable agricultural practices is now a policy priority. Efforts to reduce food loss and waste are also being stepped up, as a way to promote food security while contributing to China's national climate strategies and commitments.

President Xi Jinping's pledge in September 2020 that China would strive to peak carbon dioxide emissions before 2030 and achieve carbon neutrality before 2060[4] provides a significant window of opportunity to develop transition pathways and implementation plans to ensure food and land use contribute to these national goals.

This Action Agenda outlines five priority workstreams in areas which offer tremendous opportunities to accelerate action and promote a wider, systems change transformation agenda. These workstreams were selected after extensive stakeholder consultation; since its inception in 2019, the FOLU China platform has convened over 60 meetings and consultations with stakeholders in China and internationally.

Four of the five selected workstreams are key priorities for both FOLU China and the wider FOLU global network, while climate neutrality serves as a key cross-cutting theme. It is evident that the five workstreams represent issues that are also of high national priority in China. For instance, the country has recently adopted an Anti-Food Waste Law and its Clean Your Plate Campaign is receiving strong official backing. China is very concerned about the security and reliability of food supply chains, and FOLU believes that the sustainability of these supply chains is important as well. On agriculture, China is promoting research on ecological farms, and Chinese agricultural policies also encourage crop rotations and circular systems of farming. Healthy and balanced diets are a high priority for the government; we believe that sustainable diets are needed as well as healthy ones. China is also prioritizing carbon neutrality.

Priority workstream	Key actions
Healthy and sustainable diets to address the growing health, climate and environmental risks from current Chinese consumption patterns and to enhance Chinese food and nutrition security for current and future generations.	• Identify opportunities for integrated approaches to dietary transition • Inter-disciplinary research on healthy and sustainable diets in a Chinese context • Scope and establish 1-2 local-level pilots • Identify opportunities for business action on sustainable and healthy diets
Sustainable and regenerative agriculture to address growing GHG emissions and environmental pollution caused by overuse of synthetic fertilizers and pesticides, and serious challenges to agricultural sustainability, food safety and human health, as well as water scarcity and farmland degradation.	• Develop pathways and pilots on sustainable livestock production • Support the development of eco-compensation standards and appraisal systems for ecological farms at the provincial level • Share learning and experience on repurposing public support for agriculture • Promote frameworks, metrics and landscape-level learning to scale regenerative practices
Reducing food loss and waste to strengthen resource efficiency, food security and contribute to GHG mitigation through actions targeting food loss and waste.	• Support the implementation of the "target-measure-act" approach to achieve China's action plan on reducing food loss and waste • Develop guidelines and standards on reducing food waste for different types of stakeholders • Link reducing food loss and waste with food security, climate and environment targets in order to make a stronger case for action
Integrating food and land use into China's carbon neutrality strategies to contribute to the achievement of China's 2060 carbon neutrality target while ensuring that other key goals such as food security, environmental protection and biodiversity targets are addressed in a holistic manner which does not overshadow human and planetary health, rural livelihoods and long-term economic prosperity.	• Build a stronger evidence base to better inform climate policies • Strengthen intra-ministerial collaboration and policy coherence • Facilitate dialogue with NGOs, international collaboration and knowledge exchange • Develop pilots at the sub-national level • Advance socioeconomic research
Greening China's international soft commodity value chains to advance ecological civilization and promote protection and restoration of tropical forests and ecosystems threatened by land use change associated with agricultural commodities.	• Support development of an integrated national strategy and coordination mechanism • Strengthen existing policy priorities and instruments • Strengthen due diligence and traceability systems • Integrate finance for green soft commodity value chains with green finance

There are also opportunities for China to cooperate and share experience with other countries in reducing methane emissions and promoting green value chains, to ensure we stay on track to limit global warming and halt the loss of natural ecosystems which are critical for sustaining life on earth. China's large population, geographic size, geopolitical power, global trade and economic influence mean that the country's actions have wide implications at the global level, and for its trading partners in particular.

FOLU China aims to strengthen the scientific and economic evidence base for policy reform and demonstrate impact through local pilots and multi-stakeholder approaches. As part of a global FOLU network, FOLU China also facilitates collaboration between Chinese stakeholders and leading global experts, to share experience and learning among countries.

This Action Agenda outlines priorities, strategies and activities that FOLU China will pursue to tackle these challenges and promote a transformation of food and land use systems in line with China's national goals and targets. In publishing this Action Agenda, FOLU China aims to raise awareness and promote dialogue on these issues. We invite other interested stakeholders, including policymakers, academics, businesses and civil society, to share their perspectives and collaborate with us.

1 Introduction

1.1 The growing environmental and socioeconomic costs of China's food and land use systems

China's food systems play a vital role in nourishing its 1.4 billion people – but they also have much wider global significance. China is now the world's largest agricultural producer, contributing around half of the world's vegetables and a quarter of its meat in 2019.[5] These figures attest to the productivity of China's agriculture – which has risen significantly in the last four decades. The value added of its agricultural production, including forestry and fishing, exceeded USD 1 trillion in 2019 – one third of the global total.[6] China is also the world's largest soft commodity importer, importing 60% of globally traded soy, 30% of timber, 17% of beef, and 12% of palm oil in 2018.[7]

Home to 18% of the world's population, China has less than 9% of the world's cropland[8] and a third of the global average available freshwater on a per capita basis.[9] This resource scarcity, coupled with a history of food shortages and famine, means food security is a perennial concern and a high priority for the Chinese Government.

At the same time, along with all other countries, China is facing unprecedented environmental and socioeconomic challenges that are exacerbated by planetary crises such as climate change, groundwater depletion, water pollution, widespread soil degradation and loss of biodiversity.

Ecological crises such as climate change and environmental degradation could lead to significant costs to the Chinese food production system as well as the country's economy. In China, climate change-driven seasonal drought could lead to losses of

nearly 8% in yields of the three main cereal crops by 2030 —rice, wheat and maize—despite adoption of water-saving techniques.[10] Maize yields are likely to suffer the most of the three grains, with a projected drop of nearly one-fifth of total production; followed by wheat, with a 4% decline; and rice at 1.5%. Additionally, the heavy rainfall in 2021 delayed the planting of about one-third of China's wheat crop, resulting in the worst winter wheat production in history.[11] It is estimated that the total cost of environmental degradation in China increased from 511 billion yuan to 1.89 trillion yuan between 2004 and 2017.[12] In the future, agricultural damage is expected to worsen with increased climate change impacts over large regional and temporal scales.[13]

Additionally, key food supply chain disruptions caused by the US-China trade disputes, global pandemics, military conflicts as well as rising energy and food prices could increase the risks of food insecurity in China. For instance, the US-China trade disputes have forced China to focus on boosting domestic production and diversifying agricultural imports to secure its soybean supplies and protect its supply chains.[14] The outbreak of the COVID-19 pandemic in 2020 posed an additional threat to the nation's food security, partly due to restricted coronavirus-control measures affecting the spring harvest in different locations.[15] Turmoil in world food markets will inevitably affect China as well.

1.2 An integrated approach for FOLU and China's food and land use systems

At this critical juncture in history, the world must forge a systemic approach to dealing with planetary crises such as food security, climate change, biodiversity loss and pollution. It requires countries to bring food production and consumption within planetary boundaries while significantly cutting greenhouse gas emissions and minimizing impacts on nature. Transformation of China's food and land use systems will need to include promoting regenerative agricultural practices to restore degraded soils and reduce negative environmental impacts of agricultural production, reducing food loss and waste, shifting toward healthy and sustainable diets, and greening China's international soft commodity supply chains. These positive changes will also play an essential role in achieving China's ambitious carbon neutrality goal by 2060,[16] as GHG emissions from agriculture represent 6.7% of China's overall GHG emissions.[17]

China's geographic size, geopolitical power, global trade and economic influence mean that decisions made by the Chinese Government and Chinese companies have an outsized role on the trajectory and speed of any food and land use reform agenda. Today, China is well-placed to move forward rapidly with ambitious food and land use transformation. Such actions are well-aligned with China's existing national priorities and plans: strengthening food security; improving agricultural productivity, resilience and rural revitalization; improving the health of its citizens; promoting ecological civilization; achieving common prosperity; and meeting its carbon neutrality commitments.

China thereby offers significant opportunities to promote research collaboration and exchange across the nexus of climate, nature, nutrition, food security and sustainable development. The Food and Land Use Coalition (FOLU) is a multi-stakeholder platform that aims to transform the way we produce and consume food and use our land for people, nature and climate. FOLU China can help stimulate dialogue and bring cutting-edge ideas and global experience as China charts its own course. It can also help share the lessons from China through its global network.

This document aims to develop an Action Agenda intended to guide the strategies and activities of FOLU China for 2023-2025 in supporting the transformation of China's food and land use systems. In the next section we introduce FOLU China and a vision for sustainable food and land use systems in the country. Building upon extensive desktop research and stakeholder consultations (see Annex A for the methodology), five priority workstreams have been identified for China: healthy and sustainable diets; productive and regenerative agriculture; reducing food loss and waste; integrating food and land use into China's carbon neutrality strategies; and greening the country's international soft commodity value chains. The subsequent sections develop and operationalize each of these priority workstreams. The final section concludes.

2 China and the Food and Land Use Coalition (FOLU)

The Food and Land Use Coalition (FOLU) was established in 2017 as a community of organizations and individuals committed to the urgent need to transform the way we produce and consume food and use our land for people, nature and climate.

In its 2019 *Growing Better* report,[18] FOLU identified ten critical transitions to help key stakeholders develop holistic strategies to transform food and land use systems in order to meet national priorities and contribute to global climate, nature and sustainable development goals (see diagram below). FOLU supports science-based solutions and helps build a shared understanding of the challenges and opportunities to unlock collective, ambitious actions. China hosts one of FOLU's core country platforms.[19]

2.1 A vision for sustainable food and land use systems in China

At a global level, FOLU currently focuses on promoting food security and access to healthy, sustainable diets; spurring the adoption of sustainable and regenerative agriculture; greening soft commodity supply chains; and curbing food loss and waste. These four objectives are also key priorities for FOLU in China, along with integrating food and land use into climate neutrality strategies.

China has a remarkable opportunity to transform its food and land use systems to strengthen domestic food security; promote a vibrant rural economy; and contribute to national goals for improved nutrition, climate neutrality, ecological protection and optimised resource use. Such a transformation is essential to address growing challenges for domestic agricultural production and global food value chains

from climate change, soil degradation, biodiversity loss, water stress and future pandemic risks. It would help ensure China's food systems can meet growing domestic and global demand for food while supporting human and planetary health.

Our vision is that by 2030, food and land use systems in China:

- strengthen food security and ensure current and future generations have access to healthy, safe, affordable and nutritious food
- promote sustainable economic development and a thriving rural economy through the scaling of regenerative agriculture
- mitigate GHG emissions from agri-food systems, contributing to China's commitment to peak emissions before 2030 and achieve carbon neutrality by 2060
- optimize resource use and significantly reduce food loss and waste
- protect and enhance the resilience of natural ecosystems and agricultural systems to risks from climate change and biodiversity loss, in China and globally.

In short, our vision is that by 2030, China's food and land use systems enhance food security, promote sustainable economic development, and deliver positive outcomes for human and planetary health.

A transition to sustainable and healthy food and land use systems in China is well-aligned with many of China's existing national priorities. These include a long-standing focus on food security; recent commitments to carbon neutrality; and policy priorities for common prosperity, healthy diets and nutrition, sustainable agriculture, rural revitalisation, reducing food loss and waste, ecological civilisation as well as green finance and trade, particularly in relation to the Belt and Road Initiative.

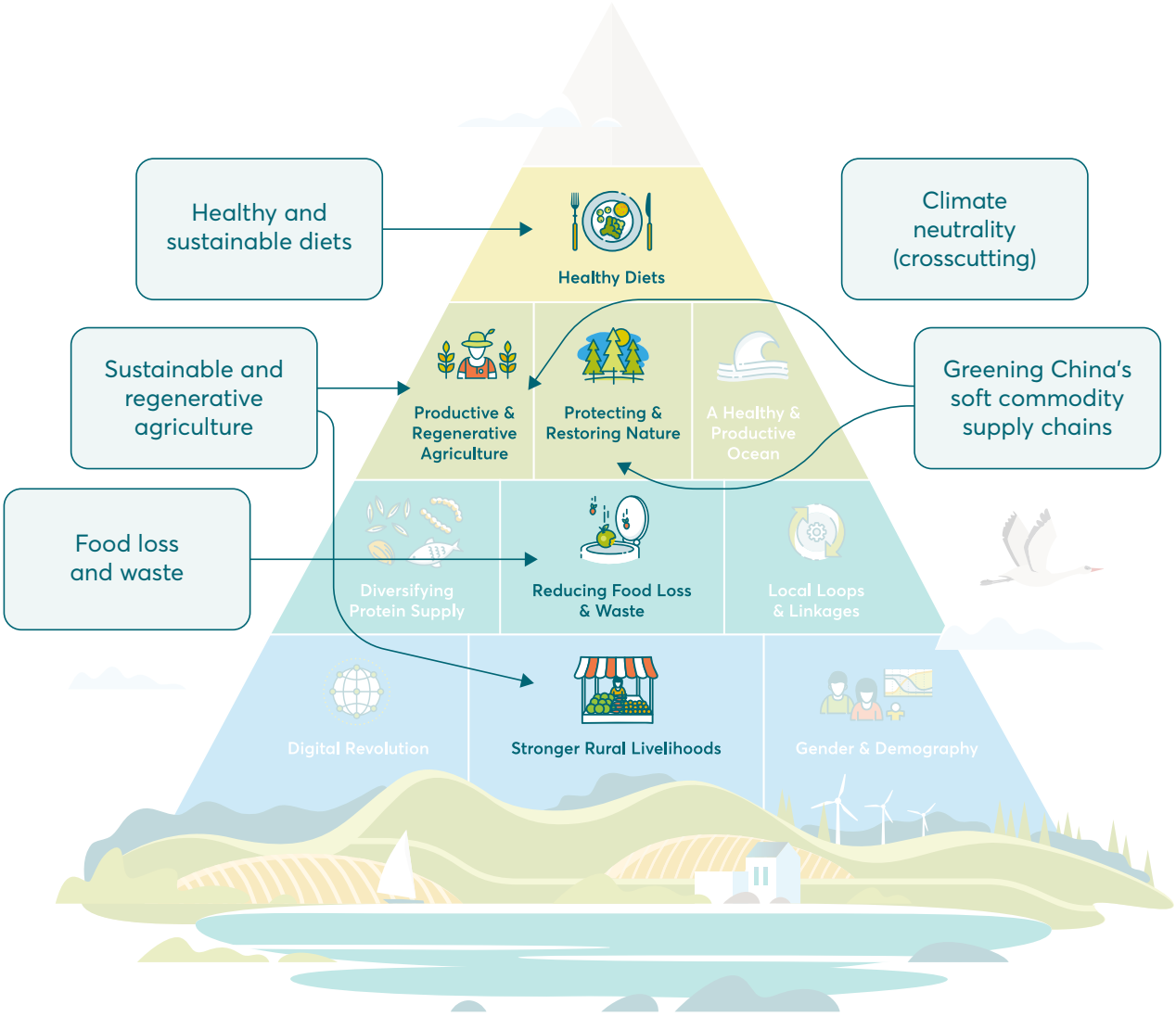
With pathways and detailed guidance now being developed in line with these priorities, we have a window of opportunity in which to focus efforts, accelerate the reform process and maximize the co-benefits of a transition to sustainable food and land use systems in China.

Diagnostic assessments, analysis and stakeholder consultations undertaken by FOLU China partners (see Section 2.2) have identified five near-term priority workstreams, which also build upon FOLU's global objectives as described above, and China's national priorities:

- **Healthy and sustainable diets** to address the growing health, climate and environmental risks from current Chinese consumption patterns and to enhance Chinese food and nutrition security for current and future generations.
- **Sustainable and regenerative agriculture** to address growing GHG emissions and environmental pollution caused by overuse of synthetic fertilizers and pesticides, and to tackle serious challenges to agricultural sustainability, food safety and human health from water scarcity, soil degradation and contamination.
- **Reducing food loss and waste** to strengthen resource efficiency and food security and contribute to GHG mitigation while supporting recently introduced legislation and government campaigns targeting food waste.
- **Integrating food and land use into China's carbon neutrality strategies** to contribute to the achievement of the 2060 carbon neutrality target while ensuring that GHG emissions are addressed in a holistic manner which does not overshadow other key goals such as food security, nutrition, human health, soil health and rural livelihoods.
- **Greening China's international soft commodity value chains** to advance ecological civilization and protect and restore tropical forests and ecosystems threatened by land use change associated with agricultural commodities.

The FOLU China platform aspires, over the longer term, to address all ten critical transitions identified by FOLU in the *Growing Better* report as the key areas to accelerate and scale food and land use transformation (see the diagram on the next page). In the near term, we prioritize the five workstreams where there is a clear alignment with China's national objectives, and where FOLU China is well-placed to contribute.

How FOLU China's workstreams map onto the 10 critical transitions for food and land use transformation



Food and Land Use Coalition, *Ten Critical Transitions to Transform Food and Land Use*

2.2 FOLU China

FOLU's country platform in China (referred to as FOLU China hereafter) was established in 2019 to bring together experts working at the intersection of agriculture, biodiversity, climate, food security, economics, environment, nutrition and trade. FOLU China's strong stakeholder networks and technical expertise enable it to work with key stakeholders who have a vital role to play in China's food systems transformation: policymakers, leading researchers, academics, local NGOs, businesses and investors. The starting point for FOLU's approach to transformational change is to align our efforts as far as possible with existing government priorities. We identify opportunities to address knowledge and evidence gaps or to promote synergies between different policy priorities in order to accelerate and/or deepen reform efforts.

We aim to strengthen the scientific and economic evidence base for policy reform and demonstrate impact through local pilots and multi-stakeholder approaches. We also play a bridging role, helping facilitate collaboration between Chinese stakeholders and leading global experts, in order to share experiences and learning among countries.

This approach is based on the context of policymaking in China: the importance of national

interests; the value placed on expert and scientific input; strong institutional and research/academic capacity; as well as the appetite for drawing on cutting edge and global best practices tailored to China's needs. Chinese experts are often called upon to provide advice to central and local government institutions.

The main approaches that FOLU China takes to achieve its strategic priorities include:

- **Research and analysis** undertaken by one or more FOLU China partners, to strengthen the evidence base for policy reform and to provide concrete pathways for action at the national and sub-national levels. China is a highly technocratic, data-driven society. In order to be credible and to make a persuasive case for any of the FOLU objectives, solid evidence and data are essential.

- **Joint knowledge generation** by Chinese and international researchers to enable a wide range of experts to contribute to specific areas of interest to Chinese policymakers.

- **Knowledge dissemination** to ensure FOLU's research ends up in the right hands. Universities and research institutes (including several FOLU China partners) can contribute ideas directly to the government through meetings as well as internal policy memos. Publishing FOLU research in prestigious Chinese and international journals is another effective channel to reach a broader network of academic experts. Op eds, blogs and social media also play an important role in reaching wider audiences.

- **Sub-national or municipal-level pilots** to generate experience and learning which can – if successful – be replicated in other localities. China often uses pilots to test innovative ideas and approaches prior to scaling to national level policies and programs.

- **Multi-stakeholder workshops**, seminars and webinars to catalyse dialogue by Chinese stakeholders around priority topics, identify specific opportunities and challenges, and highlight FOLU's work.

- **Business engagement** to put the research and knowledge into practice and bring the power of business to accelerate the food and land use transformation through policy advocacy and mobilization, relying on the strategic partnership with the World Business Council for Sustainable Development (WBCSD).

As part of a wider global network of country programmes, core partners and FOLU Ambassadors,[20] FOLU China also showcases China's experience and best practice to promote learning between countries and achieve wider impact.

3 Healthy and sustainable diets

3.1 Context

Recent dietary shifts in China have led to significant health and environmental costs

Chinese diets have undergone significant changes in recent decades. Alongside socioeconomic development, rising incomes and agricultural and market reforms, diets have diversified away from being predominantly grain-based to incorporate more fruit, vegetables, meat, eggs, dairy and seafood. Great progress has been made to reduce hunger, with the prevalence of undernourishment now below 2.5%.[21]

However, diets have also shifted to an increased consumption of ultra-processed foods and fast foods high in salt, sugar and fat, leading to more health problems. Per capita ultra-processed food consumption increased fourfold over 1997–2011 among Chinese adults (aged over 20), and was associated with an increased risk of overweight and obesity.[22] The total revenue of China's fast-food industry increased nine fold during 1999-2013, and by 13% annually since 2008, accompanied by an increase in obesity.[23]

Meat consumption in China has increased significantly in recent decades. In the 1960s, the average Chinese person consumed less than 8 kg of meat annually. By the 1980s, this amount had risen to around 20 kg per capita per year, and reached about 62 kg per capita in 2018.[24]

Today, China consumes 28% of the world's meat, including half of all pork.[25] Grain intake is declining, while cooking oil consumption has increased. Although the consumption of fruit and dairy products is growing, levels remain below those recommended in dietary guidelines.[26]

From a climate, environment and food security perspective, China's changing consumption patterns are also significant. Growing meat consumption has exacerbated domestic environmental challenges such as water pollution, biodiversity loss and soil degradation, which threaten the long-term viability and profitability of the agricultural sector. GHG emissions from China's domestic agri-food systems reached 1.09 billion tons of carbon dioxide equivalent (CO_2e) in 2018, with beef and rice production the two largest contributors.[27]

China relies to some extent on imports of feedstock (such as soy) for pigs, cattle, sheep and poultry, and of dairy products, to meet growing consumption demand. In 2018, more than 80% of soy and around 14% of beef were imported,[28, 29] accounting for 60% of the world's internationally traded soy and 17% of beef.[30] China's beef imports increased from 1.04 million tons in 2018 to 2.33 million tons in 2021, and account for about a quarter of total domestic beef consumption.[31] Unsustainable production of these globally traded commodities creates risks for both climate and the environment.[32] For instance, both beef and soy are linked to tropical deforestation in countries like Brazil.[33]

There is significant potential for shifts in food consumption patterns to contribute to broader policy objectives, in conjunction with related strategies outlined in this Action Agenda (sustainable and regenerative agriculture, greening soft-commodity value chains and carbon neutrality). For instance, curtailing consumption of ultra-processed foods would contribute significantly to the health of the Chinese population, which is a high priority for the government. Similarly, limiting meat consumption would contribute to the government's climate neutrality target by mitigating GHG emissions from the livestock sector, which represented about one third of the emissions from China's agri-food system in 2020.[34]

The policy context for healthy and sustainable diets

Nutrition policies and strategies are an important entry point. China's Food and Nutrition Development Plan[35] has detailed targets for specific food categories and nutrients as well as key strategies and tasks to achieve these. It also includes some references to sustainability in relation to food loss and waste. In 2019, the central government initiated the Healthy China 2030 campaign,[36] which promotes balanced diets as a key element of addressing nutrition issues, including the over-consumption of energy-dense nutrient-poor foods, to curb the rise in overweight and obesity rates. During two key meetings held in 2022,[37] President Xi Jinping proposed establishing the 'big food' concept, which includes the consideration of food diversification, nutrition, health, resources and environment from production to consumption.

The government has implemented a number of initiatives to ensure that healthy diets remain affordable for the ordinary consumer. For example, the 'vegetable basket project' was launched in 1988,[38] and was originally intended to address food shortages and to secure non-grain food supplies. Over its 30 years of existence, the project has gradually shifted its goals from food security to food safety, quality and diversity, with support from a giant wholesale market system. Policy tools include agricultural infrastructure development, subsidies to green production, cooperative development, insurance, training and subsidies to wholesalers and retailers.

China's series of plans, campaigns and concepts provide a favourable political context for the transition to healthy and sustainable diets, and the emphasis on identifying opportunities to further enhance existing policies and programmes is far easier to accomplish than enacting new measures. For instance, sustainability can be integrated into the National Nutrition Plan as well as the 'big food' concept. Research and stakeholder consultations are needed to pinpoint how best to proceed and where the greatest opportunities lie.

The private sector clearly has an important role to play in the transition towards sustainable and healthy diets in China, as companies determine to a large extent what foods are marketed and what is available to consumers. The food service and hospitality industry – such as cafeterias, restaurants, hotels and supermarkets – could also play a key role in changing diets if they could be made to commit to improving access to healthy foods by changing their product offerings.

The Healthy and Sustainable Diets chapter of WBCSD's Food and Agriculture Roadmap[39] provides a useful guide for working with the private sector in that it aims to motivate food businesses to take action towards food system transformation. The roadmap lays out targets, key action areas and measures needed to attain healthy and sustainable diets for all and is designed to help companies prioritize and develop solutions while promoting supportive policy, regulatory and financial

frameworks. However the most promising areas for business action still need to be identified for the Chinese context.

The potential for dietary shifts to contribute to China's climate neutrality commitment is also being explored by Chinese modellers and researchers. Reducing meat consumption to levels consistent with dietary/nutrition guidelines could reduce GHG emissions from agriculture by 7-12% by 2030 and 13-19% by 2060.[40] This would also reduce water pollution; free up land for other important economic, social and environmental activities; and reduce premature deaths from air pollution.[41]

There is also growing interest in the role of alternative proteins[42] such as cultivated meat[43] and plant-based protein[44] to address the growing demand for meat and dairy. For the first time, the Ministry of Agriculture and Rural Affairs' (MARA) 14th 5-year Agricultural Science & Technology Plan,[45] released in January 2022, identifies such "future foods"[46] (which include cultivated meat and synthetic egg/milk/oil) as a research priority. Investors are also attracted to this area. There was significant growth in plant-based protein start-ups in China in 2019-2020.[47] China's market for plant-based meat substitutes was estimated at USD 910 million in 2018 and is projected to grow 20-25% annually.[48] Challenges to scaling the nascent alternative protein industry include regulatory hurdles, consumer preferences and lack of research/analysis on the climate, environment, and nutritional impacts of such novel foods.

Chinese consumers' preferences continue to evolve. Demographic trends, particularly the growth in the size of the elderly population, will surely have impacts on these preferences, although this area has not been well researched yet. There is growing interest in food quality and safety, nutritional value and provenance, as well as issues such as animal welfare and sustainability. With appropriate policy interventions tailored to China's regional and socio-economic diversity there are significant opportunities to shift the current trajectory of Chinese diets toward healthy and sustainable choices. In this regard, pilots at the municipal or provincial level can provide models of what can be done to shift diets by other localities and nationally. Many national policies in China, such as the Household Responsibility System (initiated in agriculture in 1979), started out as local pilots and then were scaled up after they proved successful.

3.2 Objective and rationale for advancing change

The objective of this workstream is to build the evidence base and identify actions to accelerate a shift to healthy and sustainable diets in China in a manner which contributes to national priorities, plans and commitments.

The rationale for prioritizing this as a strategic area is that shifting to healthy and sustainable diets can:

- reduce rising social, health and economic costs caused by unhealthy diets, including public health costs from the increase in non-communicable diseases associated with obesity, such as diabetes, cancer and heart disease.
- enhance food security by promoting more plant-based diets and reducing the negative long-term environmental consequences of livestock production.
- contribute to China's carbon neutrality commitments and reduce GHG emissions by significantly lowering agricultural emissions from livestock and poultry farming, feedstocks and associated fertilizer usage.
- support rural revitalisation and new business opportunities that raise farmer incomes by expanding markets for locally produced and green foods.

China has national and sub-national plans as well as strategies and coordination mechanisms in place to enhance nutritional outcomes; these provide a window of opportunity to promote dietary shifts. Research on how dietary shifts can contribute to China's domestic climate and environment goals is emerging.[49] There is a significant opportunity for China to develop integrated strategies which deliver multiple objectives and minimize trade-offs.

While there is growing knowledge and evidence of how to influence consumer behaviour, much of this is focused on Western countries, and does not take the heterogeneity and regional differentiation of the Chinese population into account. More context-specific research is needed for China.

3.3 Proposed approach

China has a number of important and relevant policy priorities and plans related to nutrition, food security, climate mitigation and nature protection. These are an opportunity to demonstrate how integrated approaches to dietary transition – i.e. to healthy and sustainable diets – can contribute to broader policy objectives. While there is growing evidence, including from behavioural science, more research and analysis is needed to develop approaches that reflect the food environments in which Chinese consumers make dietary choices, taking into account cultural, regional and demographic differences.

We propose to draw on FOLU's China and global networks to build the evidence base for action through targeted research, plugging knowledge gaps through nationally and regionally specific studies. This will support policymakers to design more effective strategies to promote a transition to healthy and sustainable diets. Local governments play an important role in both policy experimentation and implementation. Successful pilots conducted at the local level have a good chance of being replicated in other localities and even scaled up to the national level. For that reason, we also propose developing one or two local pilots that will build empirical evidence and experience that can then be used to design national policies.

FOLU China is well-placed to support dietary transition through targeted research that builds knowledge and strengthens the evidence base for action. For instance, the Academy of Global Food Economics and Policy at China Agricultural University (CAU) is focusing its latest China and Global Food Policy Report on diets and nutrition.[50] Its policy memos based on its publications are often sent directly to government agencies. The Meridian Institute has recently published a report on Accelerating a Shift to Healthy and Sustainable Diets in China, which had significant FOLU inputs and carries the FOLU logo.[51]

3.4 Proposed actions

We propose focusing on the following topics and activities which cover strategy development, academic research, pilot programmes, and business engagement. Here and in other chapters we have focused on those actions which FOLU is best placed to undertake:[52]

Ⓐ **Identify opportunities for integrating dietary transition into existing policies and programmes.** Dietary transition needs to be promoted coherently from both the supply and demand sides, by filling research and policy gaps in the agricultural, nutrition, trade, and climate sectors. China has strong policies and processes in place to implement its national nutrition plan, and while sustainability is mentioned, it is not yet integrated into this framework. Education and awareness about healthy diets could also be leveraged to increase understanding of sustainability issues. Food security and trade implications need to be better understood, with opportunities to reduce supply-chain risks through dietary transition. China's carbon neutrality commitment is another important area where dietary transition is not yet incorporated. Approaches that support rural revitalisation and boost farmer incomes will also be explored.

Ⓑ **Conduct inter-disciplinary research on healthy and sustainable diets in a Chinese context.** There is a considerable gap between what Chinese consumers are currently eating and what is recommended by the Chinese dietary guidelines, as well as other healthy, sustainable dietary frameworks such as the EAT-Lancet Planetary Health Diet.[53] There are also knowledge gaps in understanding which interventions have the greatest impact on motivating behaviour change. Most studies to date have focused on Western countries, whereas there are considerable health and sustainability elements in traditional Chinese diets which can be promoted and built upon. The question then becomes how to promote healthy aspects of traditional diets in ways which appeal to modern sensibilities. Better and larger databases and inter-disciplinary research which connect food, nutrition, environment and sustainability perspectives can help develop practical strategies focused on food environments in China, reflecting regional diversity and other socioeconomic factors. More and better research is essential to fill key knowledge gaps, make the case for action and to pinpoint where interventions can be most effective. Some aspects of diets which are ripe for further research are the consumption of ultra-processed foods in China, and how best to target regulatory measures like taxes and incentives such as subsidies to curb consumption of unhealthy foods and promote healthy consumption in the Chinese context. One potential niche for FOLU would be to look at the experience of other countries and compare how they have handled dietary transitions and what lessons might be most relevant for China.

Ⓒ **Scope and establish one or two local pilots** (at city or provincial level) to create and implement a roadmap for sustainable and healthy diets. Food governance practices like the Food Policy Council/group at local level have been popular in many countries.[54] FOLU China can partner with other China-based organizations working on healthy and sustainable diets and work with local governments to scope opportunities for local-level pilots, such as nutrition labelling and eco-labelling in restaurants, e-commerce platforms and canteens. These pilots can develop and test new approaches that are based on solid empirical research to support a transition to healthy and sustainable diets.

Ⓓ **Identify opportunities for business action on sustainable and healthy diets.** Although the dietary transition is largely about consumer choices, these rely on what food producers offer. Building on the recommendations of the Healthy and Sustainable Diets chapter of WBCSD's Food and Agriculture Roadmap,[55] this activity will develop a guide for Chinese businesses to implement actions, in line with China's national goals and targets and the business opportunities and risks associated with dietary transition. The guide will include opportunities to adjust menus, product portfolio mixes and product formulation to improve nutrition and sustainability and reduce waste; to increase the share, diversity and sustainability of plant-based foods; to increase protein diversity and sustainability performance; and to support consumers to choose and access healthy and sustainable food.

3.5 Who to engage

In China, responsibility for the transition to sustainable and healthy diets sits across different ministries. Key government actors include:

- the National Health Commission: responsible for key projects to improve nutritional quality of diets
- the Ministry of Ecology and Environment: responsible for environmental pollution and climate action
- the Ministry of Agriculture and Rural Affairs: responsible for stable, safe and diverse food supply, affordability and the condition of rural areas and farmers' livelihoods
- the Ministry of Science and Technology: responsible for national R&D investments on innovative food products, nutrient-fortified food
- the State Administration for Market Regulation: responsible for market supervision, food safety, standards, testing, certification and accreditation.

Research institutes attached to these ministries, and experts from other leading universities and thinktanks, contribute ideas to inform policymaking. Some of the key research centres that are supporting elements of dietary transition include:

- the Chinese Centre for Disease Control and Prevention
- the China Nutrition Society
- the Chinese Research Academy of Environmental Sciences
- the Chinese Academy of Environmental Planning
- the Chinese Academy of Agricultural Sciences
- the Research Institute of Agricultural Development Strategy
- the Food and Nutrition Development Institute
- China Agricultural University and its Academy of Global Food Economics and Policy

Key civil society stakeholders working on these issues in China include:

- Good Food Fund
- Goal Blue
- Good Food Institute
- Wild Aid
- WWF China
- WRI China

FOLU China is best placed to work on research and engagement activities focused on healthy and sustainable diets, developing multi-stakeholder and multi-disciplinary approaches and promoting dialogue and exchange between Chinese and foreign experts working on these issues.

4 Sustainable and regenerative agriculture

4.1 Context

China's progress in agriculture and food security

China became the world's largest agricultural producer in 2019, and the country's progress in agriculture has been impressive. Between 1949 and 2020, total grain production increased six-fold and grain availability per capita more than doubled.[56] China is also the world's number one producer of vegetables and meat, accounting for about half and a quarter of the world's total production in 2019, respectively.[57] The productivity of Chinese agriculture is all the more remarkable in light of the resource scarcity the country faces.[58] In 2020, 51.3% of cropland was irrigated, with the rest being rainfed.[59]

Given the history of food shortages and famine, food security – through primary reliance on domestic production – is a high priority for the Chinese Government.[60] Successive policies since 1949 have focused on improving yields and promoting rural development, enabling agricultural production to largely keep pace with rising demand and reducing rates of hunger and malnutrition. Land reforms, financial incentives, improvements to agricultural infrastructure and the removal of market barriers have enabled millions of farmers to adopt modern agricultural technologies, invest in agricultural inputs and access global markets.

China is also actively collaborating with other countries on agricultural trade and exchange. The The Association of Southeast Asian Nations (ASEAN) region has become China's largest agricultural trade partner, with total bilateral agricultural trade valued at USD 43 billion in 2020.[61] China has signed more than 30 bilateral agricultural cooperation agreements with ASEAN nations and has established a Joint Committee on Agriculture with eight ASEAN countries. In addition, agriculture is a key area for collaboration between China and Africa. In 2021, President Xi Jinping announced the 2035 Vision and the Dakar Action Plan, which prioritize agricultural collaboration and trade.[62]

Environmental and climate challenges in the agricultural sector

In spite of these achievements, there are serious sustainability challenges in agriculture, including resource overexploitation, overuse of agricultural inputs and water resources, and environmental degradation.[63] Years of unsustainable farming practices have damaged agroecosystems that play a critical role in China's food systems. Over 40% of arable land in China was degraded in 2012,[64, 65] and more than 20% suffers from high levels of heavy metals such as cadmium, copper, lead and zinc, according to a 2013 survey.[66] Over-application of fertilizers and pesticides have contributed to soil degradation, and agriculture is now the largest source of China's water pollution.[67] About 13% of China's rivers are considered severely polluted and more than 30% of the country's lakes suffer from eutrophication.[68] China accounted for 22.5% of global fertilizer use in 2020.[69] Meanwhile, of the 230 million farm households in China, 210 million operate on less than 0.67 ha of cultivated land.[70] Many are struggling with poor productivity and profitability, as well as a shrinking rural labour force.

Greenhouse gas emissions from China's agricultural production[71] rose by 18% between 1990 and 2018, from 600 to 710 million tons of CO_2e, now accounting for 5.4% of the country's total GHG emissions in 2018 (excluding land use, land-use change and forestry, LULUCF), according to research by China Agricultural University.[72] These are primarily from farmland emissions, animal enteric fermentation, rice cultivation, manure management and agricultural residuals, predominantly N_2O and CH_4 emissions.[73] Rice and beef are the two largest sources of agri-food related GHG emissions, accounting for 26.4% and 16.7% of the total agricultural GHG emissions in 2017, respectively, according to this research.[74]

As the world's largest livestock producer,[75] China's livestock sector is a significant contributor to its GHG emissions. Total GHG emissions from the livestock production chain increased from 233 to 520 million tons (MT) of CO_2e between 1980 and 2010, and methane (CH_4) accounts for about 50%.[76] China has also imported over 2 million tons of beef and about 100 million tons of soybeans annually since 2019.[77] This has raised concerns over growing GHG emissions and deforestation in some Latin American countries.[78] Livestock production also causes serious water and soil pollution.[79]

Sustainable agriculture has been prioritized by the Chinese Government

Addressing these negative social and environmental impacts and promoting sustainable agricultural production is a policy priority for the Chinese Government. Research is now focused on how China's agricultural sector can contribute to its carbon neutrality goals. A new National Administration for Rural Revitalization (NARR) under the State Council aims to create a vibrant rural economy, improving the livelihoods of farmers and further closing the prosperity gap between rural and urban areas.

China's National Sustainable Agriculture Development Plan (2015-2030), issued by MARA, focuses on reducing agricultural inputs and improving ecosystem health. Priorities include optimizing development and productivity, protecting arable land, using water more efficiently, curbing environmental pollution and restoring agroecosystems. Subsidies for chemical fertilizers have been removed, with farmers encouraged to shift away from chemical-intensive crops; make better use of innovative, enhanced fertilizers, animal manure, plastic mulches and agricultural residues; and to introduce crop rotations, fallowing, water-saving irrigation and sustainable nutrient management.[80]

In order to achieve sustainability, China has already begun to reform agricultural support policies, including to achieve environmental objectives.[81] Agricultural subsidies in China amounted to CNY 308.2 billion in 2020, which was 22% of agricultural GDP (close to the world average of 23%). One key programme has been the 'Grain for Green' initiative or 'Conversion of Cropland to Forest Program', which promoted afforestation and the conversion of marginal agricultural lands to grass and trees.[82] The 'double reduction' policy which subsidizes organic fertilizers and soil nutrient management techniques, has contributed to a decline in the use of chemical fertilizers and pesticides.[83] Agricultural subsidy reforms in China promote organic fertilizers via the return of straw to agricultural lands and the recycling of other agricultural wastes.[84]

However, much remains to be done to repurpose agricultural support in order to transform agri-food systems in China and to meet the goals of enhanced nutrition, health, environmental protection and carbon neutrality. For instance, less than 5% of agricultural support expenditures are devoted to sustainable development, compared to around 40% in the EU.[85] Eco-compensation policies for sustainable practices are lacking, although some provinces are currently experimenting with them.[86] Awareness-raising programmes for farmers to adopt sustainable farming practices are also lacking.[87, 88]

Knowledge and evidence on sustainable and regenerative agriculture in China is needed

In this section, we use the terms sustainable and regenerative agriculture together, rather than only one of these terms. One reason for this is that sustainable agriculture is a commonly used term in China and has a long history, as discussed below. As defined by the FAO, sustainable agriculture is "the management and conservation of the natural resource base, and the orientation of technological and institutional change in such a manner as to ensure the attainment and continued satisfaction of human needs for present and future generations." Sustainable agriculture "conserves land, water, plant and animal genetic resources, is environmentally non-degrading, technically appropriate, economically viable and socially acceptable."[89]

Seen from a historical perspective, sustainable agriculture in China has deep roots. As documented by the American agronomist F.H King in his classic 1910 text Farmers of Forty Centuries,[90] traditional agriculture managed to maintain the fertility of China's farmlands over 4,000 years through extensive use of techniques such as terracing, crop rotations, inter-cropping, planting legumes as green manures, composting, and the return of crop residues, human and animal waste to the land. Modern ecological agriculture[91] in China today draws upon these practices, among others, as does the concept and practice of circular agriculture.[92] Both of these concepts are being promoted by the government.

What is far newer in China is the concept of regenerative agriculture, which is gaining increasing currency internationally as a paradigm for environmentally beneficial agricultural production. However, there is a lack of consensus to date on exactly what the term means.[93] Here we define regenerative farming practices as those that "build soil organic matter and support soil life in ways that enhance and maintain fertility over time."[94] Regenerative agriculture can be seen as a way of describing a shift in ambition from sustainability – holding the line at a steady state that doesn't worsen – to regeneration, the ambition of actually improving environmental outcomes (e.g. soil health, biodiversity, etc) through agricultural management practices.

Practices commonly associated with regenerative agriculture include "no-till/minimum tillage techniques, the use of cover crops, crop rotations, compost, and animal manures, the inoculation of soils with composts or compost extracts to restore soil microbial activity, and managed grazing."[95] A recent FOLU report finds that many regenerative agricultural practices can have a positive impact on on-farm biodiversity and carbon sequestration, but effects on on-farm net greenhouse gas emissions are mixed and effects on yield are highly variable.[96]

The question of how much evidence there is for regenerative agricultural approaches in China is a difficult one to answer, partly because the concept of regenerative agriculture is such a new one in the country. However, as noted earlier, concepts such as sustainable agriculture, ecological agriculture and circular agriculture have long histories in China, as well as having many practices in common with regenerative agriculture. There is evidence that soil organic matter has been increasing during the last 30 years in China through the adoption of regenerative practices like no-till/minimum tillage and returning crop residues and organic manures to the land.[97] As soil fertility is still low in China, potential for soil carbon sequestration is estimated to be significant.[98,99] Academic literature making the overall case for what regenerative agriculture can offer in China is also emerging.[100, 101]

At the same time, more evidence is needed in the Chinese context for a number of parameters such as yield, carbon sequestration potential in different agroecosystems and under different production regimes, as well as labour requirements, revenue and production costs. Given the government's concerns about food security, the impacts of regenerative practices on productivity are important, and more research needs to be devoted to how to minimize yield penalties. This is critical in the Chinese context as well as internationally, because yield declines domestically could increase the need for food imports from other countries, hence externalizing the environmental costs of agricultural production. At the same time, making agriculture more sustainable and regenerative can also be packaged as a means of enhancing China's self-reliance, because soil degradation undermines productivity in the medium to long term and regenerative agricultural practices can address this problem.

4.2 Objective and rationale for advancing change

The objective of this workstream is to accelerate the uptake of sustainable and regenerative agriculture in China, in a manner which contributes to China's national priorities, plans and commitments. The rationale for prioritizing this as a strategic area is that sustainable and regenerative agriculture can:

- help address key environmental challenges such as degraded land, soil and water pollution and biodiversity loss
- contribute to China's commitment to peak carbon emissions by 2030 and carbon neutrality by 2060
- ensure longer-term viability and profitability of China's agriculture sector, and contribute to rural revitalization
- enhance longer-term food security by improving the health of the natural resource base upon which agricultural production depends.

4.3 Proposed approach

China has a number of important policies and plans, such as the National Sustainable Agriculture Development Plan, to incentivize the scaling up of sustainable agriculture. However, there are some key knowledge and policy gaps in how to achieve these goals, particularly on increasing soil and ecosystem health, and ensuring that the agriculture sector contributes to China's current national carbon neutrality roadmap and Nationally Determined Contribution (NDC). While China has a longstanding tradition of practising sustainable agriculture, it would still be beneficial to exchange with international researchers and practitioners on this topic. There is also the challenge of uptake of knowledge at the farm level.

FOLU China can support the scaling of sustainable and regenerative agriculture through targeted research and analysis, and developing pathways, pilots and policy recommendations. FOLU China can also draw on its broader global network to support engagement by Chinese stakeholders with other relevant initiatives focused on sharing knowledge and experiences. This can help China identify relevant approaches which will improve agricultural productivity and reduce environmental impacts, land degradation and land conversion. These include the Just Rural Transition initiative (JRT), which is supporting global policy dialogue and peer-to-peer learning on repurposing public support for agriculture; and Regen10, which aims to develop frameworks and foster learning to scale regenerative food systems.[102]

4.4 Proposed actions

FOLU China is well-placed to support the promotion of sustainable and regenerative agriculture in China through targeted research that builds the evidence base for action, pilots that showcase successful approaches at the local and provincial level, and joint action with the private sector. We propose focusing on the following topics initially (with additional topics to be added as greater resources and capacity become available):

Ⓐ **Develop pathways and pilots on sustainable livestock production.** As demand for meat and milk products increases in China, finding more sustainable and productive approaches to livestock farming which also address climate change is critical. Regenerative grazing and forage management have been found to increase soil carbon sequestration, reduce GHG emissions and contribute to the provisioning of important ecosystem services in North America[103] and South Africa,[104] and could potentially be employed more widely in China. However, it is important to note that context is important and regenerative grazing techniques employed elsewhere would likely need to be adapted to the local context – hence the need for more research on this topic in China. Another promising area is alternative animal feeds. They can provide protein substitutes (e.g. instead of soy) and reduce methane emissions from ruminants (e.g. via seaweed added to feeds), both of which could contribute to land saving and GHG mitigation in China and in its trading partners. The Chinese Academy of Sciences (CAS) is leading research to develop sustainable approaches to livestock production across the whole industry supply chain. FOLU can work with CAS to develop a new roadmap and pilots to demonstrate the potential for sustainable transformation of livestock systems.

Ⓑ **Support the development of eco-compensation standards and appraisal systems for ecological farms at the provincial level.** MARA has been establishing pilot ecological farms since 2021[105] in which the concept of regenerative agriculture could be integrated and tested. FOLU can support the efforts of researchers at China Agricultural University who are working with several provincial governments to develop eco-compensation standards for ecological farms, as well as appraisal systems to assess farm performance. If done well, eco-compensation can provide greater incentives for farmers to adopt sustainable and regenerative practices. Some provinces, such as Jiangsu and Zhejiang, are frontrunners in eco-compensation policies in the agricultural sector, and initiatives there can serve as examples for other parts of the country.

Ⓒ **Share learning and experience on repurposing public support for agriculture.** Analysis from FAO-UNDP-UNEP has found that 87% of current support to agricultural producers, totalling approximately USD 540 billion per year globally, includes measures that are often inefficient and inequitable, distort food prices, harm people's health, and degrade the environment.[106] As discussed above, China is exploring evidence on repurposing policies and public support to phase out those which contribute to environmentally harmful outcomes. However, more can be done to redirect public investment to scale sustainable and regenerative agriculture. The Academy of Global Food Economics and Policy (AGFEP) team in CAU has initiated a major national project to advise the Chinese Government on repurposing agricultural support and is keen to share China's experience with the world. FOLU can help connect Chinese researchers with international initiatives to support peer-to-peer learning and develop criteria to measure progress.

Ⓓ **Promote frameworks, metrics and learning to scale regenerative practices.** Although there are similar concepts and agricultural practices in China, the concept of regenerative agriculture is still new to the country and needs to be promoted. The recently launched initiative Regen10[107] aims to accelerate the global transition to regenerative food systems by significantly increasing the proportion of the world's food that is produced in a way that delivers positive outcomes for people, nature, and climate. FOLU China can support engagement by Chinese stakeholders in Regen10 by helping to create a shared vision of regenerative food systems in China, supporting the role of farmers as leaders of change, identifying existing landscape level approaches in the country and/or scoping opportunities for innovative pilots, adapting international frameworks and metrics for the Chinese context and sharing learning within a global network to promote wider impact.

4.5 Who to engage

In China, responsibility for a transition to sustainable and regenerative sits across the following ministries:

- The Ministry of Agriculture and Rural Affairs (MARA): responsible for agricultural production, the condition of rural areas and farmers' livelihoods.
- The Ministry of Ecology and Environment (MEE): responsible for environmental quality monitoring, pollution control and relevant technical guidelines, as well as certain aspects of climate change.

Some of the key organisations that are influential in agricultural matters and need to be engaged include:

- The Research Centre for Rural Economy (RCRE), a key institute under MARA
- The Chinese Academy of Agricultural Sciences (CAAS)
- The Centre for Agricultural Resources Research at CAS
- The Rural Development Research Institute at Zhejiang University
- The Resources and Environment Institute at China Agricultural University (CAU)
- The Academy of Global Food Economics and Policy at CAU
- The School of Agricultural Economics and Rural Development, Renmin University
- The Research Institute of Agricultural Development Strategy

Key civil society stakeholders working on agricultural issues in China include:

- TNC China
- WRI China

Key businesses working on sustainable and regenerative agriculture in China include:

- Syngenta Group China: Leading agricultural company specialized in seeds and pesticides
- Danone: Leading multinational food and beverage company
- COFCO: China's largest food producer, manufacturer and trader
- Mengniu (and Shengmu): China's leading dairy producer
- Unilever
- Beidahuang Group.

5 Reducing food loss and waste

5.1 Context

Food loss and waste is a critical challenge for China. Approximately 35 million tons of food are lost or wasted in China each year, enough to feed 30-50 million people.[108] Per capita, diners waste around 12% of food consumed in restaurants, while up to 38% of food is wasted by big parties.[109]

In recent years, the Chinese Government has included reducing food loss and waste as one of the key pathways for green consumption, contributing to food security, climate and environmental targets. A number of goals and related policy measures have been introduced to guide action.

In 2015, China committed to the Sustainable Development Goal of reducing national food loss and waste levels by 50% by 2030.[110] In 2020, President Xi Jinping reiterated the commitment to reduce food loss and waste by calling for a revitalization of the country's "Clean Your Plate" campaign and publishing the Anti-Food Waste Law[111] to serve as the legal foundation of food loss and waste work in China.

Reducing food loss and waste is expected to contribute to President Xi Jinping's pledge to reach peak national greenhouse gas emissions by 2030 and achieve net zero emissions by 2060. The National Action Plan of Carbon Peaking Before 2030, which serves as the guiding policy for the "dual carbon goals," has incorporated reducing food loss and waste in the national climate policies.[112]

More granular and detailed policies have now been published which prioritize the tasks for the next few years. These include the Work Plan on Reducing Food Loss and Waste of the Whole Food Supply Chain[113] and the National Action Plan of Crop Conservation (NAPCC), which sets targets and outlines tasks focused on both the food production and consumption side, to significantly reduce food loss and waste by 2025.[114] The NAPCC takes a farm-to-fork approach, setting annual objectives, tasks and implementation plans for food loss and waste reduction; establishing national and industrial standards and evaluation systems for the whole food supply chain; and strengthening supervision and management.

Corresponding local agencies of the relevant national level government agencies will be responsible for developing strategies, setting targets, conducting

measurement and evaluation, as well as supervising food loss and waste reduction work at local level. Several provinces and cities have already begun this process, including Shandong, Zhejiang,[115] Jiangsu[116] and Beijing.[117] Local action plans or policies are being developed to establish the policy and enforcement system in the next two to three years.

In 2020, the Ministry of Agriculture and Rural Affairs (MARA) published the Technical Guidance on Grain Crop Mechanized Harvest Loss to help reduce crop loss at harvest.[118] It must now develop guidelines and standards for "hotspots" upstream and downstream of the food supply chain (e.g. agriculture production, processing, retailers, restaurants, canteens, etc.), organize pilots and scale up the standards to be incorporated into the daily operations of each type of stakeholder.

In response to these policy signals, food associations, large food companies and e-commerce platforms have developed initiatives and strategies to reduce food loss and waste. Multi-stakeholder partnerships have also been established to drive the "whole food supply chain" and "actor specific" approach.[119] The "Improve Resource Efficiency and Reduce Food Loss and Waste" Platform, established in 2019, aims to create the space for cooperation among national government agencies, Chinese businesses and international organizations.[120] China's Jinan Initiative of the International Conference on Reducing Food Loss and Waste also demonstrates its willingness to share experiences and strengthen international collaboration on this issue.[121]

5.2 Objective and rationale for advancing change

The objective of this workstream is to help China meet its national food loss and waste targets by strengthening "whole food supply chain" and "actor specific" approaches.

The rationale for prioritizing this as a strategic area is that reducing food loss and waste can:

- Strengthen food security and help meet the food demands of 200 million people[122]
- Reduce the environmental impacts of agriculture, saving 370 billion cubic meters of water and significantly decreasing fertilizer pollution[123]
- Contribute between 4% – 7% of the emission reductions needed for China to achieve its 2060 carbon neutrality goals[124]
- Reduce demand for 13 million hectares of agricultural land, enabling marginal agricultural land to be used for other purposes, including China's reforestation goals[125]
- Help companies reduce food loss and waste in their daily business and hence reduce the associated costs, as well as contribute to carbon peaking and neutrality targets at the company level.

5.3 Proposed approach

Reducing food loss and waste is well-established as a policy priority in China, and incorporated into its agriculture,[126] climate,[127] environment[128] and consumption transformation[129] policies as a priority pathway to achieve China's food security, carbon peaking and neutrality as well as pollution reduction targets. China announced the Anti-Food Waste Law and action plans to reduce food loss and waste at national level in April 2021. Its National Action Plan of Crop Conservation prioritizes future tasks from eight perspectives, including: general measures on reducing food losses from agriculture production, post-harvest storage, transportation, and processing; reducing food waste from the consumption side; promoting innovation technologies; strengthening public education and supporting mechanisms.

To deliver on these policy goals and targets, important knowledge gaps need to be addressed, and enforcement mechanisms need to be designed and implemented at the national and local level. Reducing food loss and waste at scale will require numerous

actors in the food supply chain to implement a variety of context-specific interventions.[130]

FOLU China will support these efforts through targeted research, analysis and activities. Leveraging WRI's broader expertise and the FOLU China network, our approach will be to encourage Chinese stakeholders to adopt a "whole food supply chain" and "actor specific" approach. This supports different stakeholders (e.g. governments at national and local levels, private sector, universities, civil society, etc.) to take a "target-measure-action" approach[131] to reduce their food loss and waste.

5.4 Proposed actions

FOLU China proposes focusing on the following areas:

Ⓐ **Support the implementation of the "target-measure-act" approach to achieve China's action plan on reducing food loss and waste.** In line with the objectives, targets and tasks of China's Anti-Food Waste Law and the National Action Plan of Crop Conservation, FOLU can support policymakers to develop implementation strategies. This will involve reviewing and summarizing international case examples of food waste laws and their implementation to identify lessons relevant to China. FOLU will also convene stakeholders to discuss the policies' interpretation, possible modes of implementation at national and local levels, and relevant standards for key sectors (e.g., restaurants, food retailers, food delivery platforms) to build consensus on how to implement them.

Ⓑ **Develop guidelines and standards on reducing food waste for different types of stakeholders.** Industry associations are now required to develop standards for different types of companies (e.g. e-commerce, retailers, restaurants) to guide their actions on reducing food loss and waste. Universities and government canteens also need to develop relevant standards. FOLU could work with these stakeholders to support the development and piloting of strategies, tactics and standards that different types of companies (e.g. restaurants and food retailers) could pursue to satisfy the policy requirements. It could build the compliance capability of practitioners through workshops, training and study tours. The Food Loss and Waste Accounting and Reporting Standard offers globally consistent requirements and guidance on what to measure and how to measure it when it comes to food loss and waste, and serves as a science-based foundation to provide guidance for quantifying and reporting on food loss and waste in a way that ensures clarity and comparability. FOLU's global platform and other platforms established by WRI (e.g. Champion 12.3, 10x20x30) can also be leveraged to connect Chinese and international stakeholders to facilitate dialogue and knowledge sharing and to provide a channel to share Chinese experiences with other developing countries.

Ⓒ **Link reducing food loss and waste with food security, climate and environment targets to make a stronger case for action.** While China has sent strong policy signals regarding its intention to reduce food loss and waste, there are currently very few studies on the linkages between food loss and waste and food security, GHG emission reduction, pollution reduction and wider economic benefits. FOLU will help fill these knowledge gaps, working with partners to make the case to public sector think tanks and companies on how reducing food waste can help the country achieve its carbon neutrality target. Leveraging global best practices and cases, FOLU could provide analytical evidence, examples from elsewhere, and compelling narratives regarding food loss and waste reduction to public sector think tanks and companies while they discuss what to include in the country's or companies' carbon neutrality target.

5.5 Who to engage

In China, 20 different ministries and government agencies are involved in the food loss and waste reduction strategy, including:

- The National Development and Reform Commission, which leads and coordinates the overall management on food loss and waste reduction
- The Ministry of Agriculture and Rural Affairs, which leads on reducing food loss
- The Ministry of Commerce, State Administration for Market Regulation, Ministry of Education and the National Government Office Administration, each of whom has a role on the food waste side.

Some of the key organizations that are influential in food loss and waste matters and need to be engaged include:

- Research Center for Rural Economy, Ministry of Agriculture and Rural Affairs
- Center for Price Cost Investigation, National Development and Reform Commission
- Chinese Academy of Sciences
- Chinese Academy of Agricultural Sciences

Key associations working on this issue in China include:

- China Chain-Store & Franchise Association
- China Hospitality Association
- China Chamber of International Commerce.

6 Integrating food and land use into China's carbon neutrality strategies

6.1 Context

The food and land use system is essential to achieving carbon neutrality in China

On 28 October 2021, China released its updated NDC, which aims to peak CO_2 emissions before 2030 and achieve carbon neutrality before 2060.[132] Consequently, in the coming years, climate mitigation targets must be determined for all economic sectors based on sector specific research, including for food and land use systems.

The significance of emissions from the food and land use sector are historically overshadowed by other key industry sectors such as energy, transport, manufacturing and construction. However, GHG emissions from China's food and land use systems are roughly 1,875 tCO_2e per annum,[133] accounting for 17% of the country's total emissions.[134] On-farm agricultural production is by far the largest source of emissions from China's food and land use systems (44%), followed by post-production and consumption (31%).[135] Of the three main greenhouse gases (CH_4, CO_2, N_2O) from agricultural production, CH_4 and N_2O emissions together account for about 52% of the total.[136] When disaggregating these into

component subcategories, the food consumption sector was by far the largest emitter, followed by food waste disposal, enteric fermentation, synthetic nitrogen fertilizer application, fertilizer manufacture and rice cultivation.[137]

However, carbon removals (or sequestration) from forests (mainly from major afforestation efforts undertaken in the past two decades) can also play a significant role in mitigating GHG emissions from food and land use systems. Accounting for these helps to bring the annual net GHG emissions from the food and land use system down to 1,164 $MtCO_2e$,[138] or 10% of total emissions in China.

Managing dietary shifts and tackling excess and wasteful food consumption will be critical for China's carbon neutrality ambition as they consist of important drivers of food and land use emissions. More specially, this includes tackling food loss and waste (FLW) and unhealthy diets. For instance, studies show that rising demand for livestock products is projected to require between 3 and 12 million hectares (mHa) of additional pastureland in China between 2020 and 2050, resulting in –2% to +16% in agricultural GHG emissions. respectively.[139] Hence, incorporating the food and land use sector presents a significant opportunity for China to develop an integrated approach to achieving carbon neutrality.

A systemic policy framework is needed

To date, China has developed long-term low-carbon strategies and pathways for energy and energy-related sectors, including transport, buildings and industry, as well as a well-established policy framework for curbing energy-related GHG emissions.[140] It now needs to develop an AFOLU (agriculture, food and other land use) strategy alongside energy and energy-related sectors to move towards the carbon neutrality goal. Achieving the carbon neutrality target before 2060 will require a systemic approach that will substantially reduce emissions and allow carbon offset and neutralization across all sectors of the economy.[141] Thus China – like all other countries – will need decarbonization pathways not only for energy and energy-related sectors, but also for the food and land use system. These pathways must fit together and add up to carbon neutrality.

China, like many other countries, lacks analyses and a systematic policy framework for curbing GHG emissions related to its food and land use sector.[142] Chinese researchers and policymakers are now focused on how to close this gap. Of particular importance in the AFOLU sector are Nature-based Solutions (NbS) – such as increasing soil carbon content in low-middle quality croplands, afforestation and increasing vegetation cover – as they can increase natural carbon sinks, notably carbon storage in the biomass above and below the soil, that could help neutralize the residual emissions from other sectors.

Another key area for consideration as China develops its climate neutrality strategy for the food and land use sector is the socioeconomic impacts of climate neutrality policies. This includes the differentiated welfare effects felt by different income groups and/or rural and urban populations, as well as the potential impacts on job quantity and quality. Such information will help policymakers to better understand not only the benefits and costs of system transitions in the food and land use system, but also how they are distributed among different segments of the population; identify solutions (e.g., legal, policy and financial instruments) to remove the anticipated negative effects; and ensure smooth system transitions towards fair and equitable socioeconomic outcomes.

6.2 Objective and rationale for advancing change

The objective of this workstream is to ensure that the potential of food and land use systems to contribute to climate mitigation is well understood by key stakeholders in China (e.g. researchers, academics, policymakers and NGOs) and that systemic approaches are being developed and adopted to reach carbon neutrality.

The rationale for prioritizing this as a strategic area is that developing a systemic approach for the food and land use sector in China to reach carbon neutrality can achieve the following goals:

- Contribute to the science base and help set the direction for research on carbon neutrality in the food and land sector in China
- Help shift the policy paradigm towards an integrated approach for the development of coherent policies to achieve carbon neutrality within and between sectors
- Promote inter-ministerial collaboration, especially between NDRC and MARA, to support the carbon neutrality goal and to bring the potential of carbon neutrality in food and land use systems to the attention of high-level decision-makers in China
- Improve the understanding of the role of China's food and land use systems in meeting climate goals, and facilitate collaborations among researchers, policymakers, NGOs, and citizens
- Advance research on socioeconomic impacts of proposed food and land use system transitions in China and promote fair and equitable sharing of costs and benefits of the associated transitions.

6.3 Proposed approach

Chinese institutions at the national, provincial and local level are currently scrambling to develop climate neutrality plans. Our aim is for quantifiable emission reduction targets to be established for the food and land use system and integrated in the next revised NDC. Moreover, clear decarbonization pathways need to be developed for food and land use systems, taking full consideration of their respective costs, benefits and socioeconomic impacts, as well as the need to balance climate neutrality with other key goals such as rural livelihoods, agricultural sustainability, etc.

This creates a window of opportunity for FOLU China to bring Chinese and international experts together to assist in developing carbon neutrality plans that include the AFOLU sector. China is a highly technocratic, data-driven society. Solid evidence and data are essential to make a persuasive case for this and to help Chinese national and local governments develop better informed policies. Climate neutrality in particular is a highly technical subject requiring specialized tools and methodologies.

Given that there is currently a dearth of up-to-date research, FOLU China will strengthen collaboration with leading research organizations to identify key knowledge gaps and priorities and invest in research that aims to better understand the emission reduction potential in Chinese food and land use systems. This is important, as carbon emissions and emissions reduction in food and land use systems often involve complex ecological processes which make it more difficult to model than those associated with the energy system, carbon capture and sequestration technologies.

FOLU China can support these efforts by establishing and convening technical working groups involving leading Chinese universities and research institutes (such as CAU and CAS) to develop joint knowledge products to inform government decision making through partners' existing communication channels. We will deepen our engagement with relevant governmental agencies to co-create policy studies that will inform policy decisions to systemically address GHG emissions in China's food and land use systems. We will publish findings in prestigious international and Chinese journals, particularly those which carry a significant degree of weight in academic circles in China. And finally, we will work at sub-national (provincial or municipal) level to test and pilot new approaches. This can generate experience which, if successful, has much greater chance of uptake by other localities or even at the national level.

6.4 Proposed actions

To support the integration of food and land use into China's carbon neutrality strategies, we propose actions in the following five areas:

Ⓐ **Build a stronger evidence base to better inform climate policies.** We will integrate research and analysis from other FOLU China workstreams (healthy and sustainable diets, food loss and waste, sustainable agriculture and greening value-chains) and work with partner organizations, including those working on agricultural GHG inventory calculation, to undertake research that addresses specific identified knowledge gaps. This includes methods to better account for GHG emissions in the AFOLU sector, options for emission reduction and carbon peaking analysis. We will develop decarbonization pathways for agriculture and food sectors with estimated costs and analysis of potential socioeconomic impacts associated with proposed transitions. We will conduct analysis on synergies and trade-offs between different policy goals (e.g. carbon neutrality, food security, reducing soil and water pollution, water conserving irrigation, farm biodiversity improvement, building farms' climate resilience, etc). Finally, impacts of changes in international trade policies on China's domestic land use and the respective emissions from food and land use systems will need to be studied. For instance, as one of the largest soy importers, reducing soy imports from forest countries like Brazil raises the question of how to meet domestic food demand without expanding agricultural production.

Ⓑ **Help to strengthen inter-ministerial collaboration and policy coherence.** Climate policies in China have historically been co-led by the government agencies responsible for economic development (i.e. NDRC) and environment (i.e. MEE). There are opportunities to build on China's existing consultative mechanisms to enhance policy coherence. FOLU China will deepen engagement with Chinese government agencies involved in climate policies and co-develop policy studies that aim to address specific policy questions. FOLU China will also develop dedicated communication and engagement strategies to promote systems-thinking approaches among Chinese stakeholders, such as FOLU's Ten Critical Transitions, and the Sustainable Food Trust's Global Farm Metric, which aims to help farmers systemically address their whole-farm impacts (incl. environmental, social and economic impacts) in a rigorous and consistent way to accelerate the transition to more sustainable food and farming systems. Such approaches can help ensure that pursuit of "net-zero" targets does not overshadow equally important goals such as food security, nutrition, human health, soil health, etc. FOLU China will highlight opportunities for Nature-based Solutions (e.g. agroforestry and regenerative agricultural practices) as cost-effective ways of increasing carbon sinks, contributing to carbon neutrality goals by neutralizing or offsetting residual emissions from the agriculture sector, as well as the energy sector and other industries.

Ⓒ **Facilitate dialogue with NGOs, international collaboration and knowledge exchange.** NGOs in China can play an important role in developing engagement and communication strategies that will support the implementation of food and land use policies and system transition towards the carbon neutrality goal. FOLU China will support efforts of domestic and international NGOs and relevant government campaigns that contribute to emission reductions in food and land use systems, such as the "Clean Plate" campaign against food waste. FOLU China will work with these stakeholders to advocate for balanced approaches so that equally important goals such as soil health, biodiversity conservation and rural livelihoods are not undermined on the path to achieving carbon neutrality. Activities will include organizing dialogue between different research institutes to help break down disciplinary silos in climate research and communicating research findings to raise public awareness. FOLU China will support China's engagement in relevant global and regional initiatives to help learn from countries more advanced in research on GHG emissions from the food and land use sector, and to share China's emerging learnings with other countries.

Ⓓ **Develop pilots at the sub-national level** to support sub-national and local governments to develop their own pathways for the food and land use sector towards carbon peaking and neutrality and identify options to mitigate the trade-offs between different sectors and regions.

Ⓔ **Advance socioeconomic research** to assess the costs and benefits, as well as the socioeconomic impacts, of proposed food and land use system transitions in China. FOLU partners are aware that measures to reach carbon neutrality will have important socioeconomic implications.

Not only do many livelihoods in China depend on the value chains of these sectors, but the mitigation actions needed are likely to have varying implications across and within specific agricultural value chains, land use sectors and geographies that have differing degrees of sensitivity and relevance to the mitigation of CO_2 emissions. If not properly managed, well-intentioned carbon neutrality policies may lead to undesirable and unintended socioeconomic consequences that will result in instability in society and threaten the central government's policy goal of reaching common prosperity. Therefore, in the coming years, FOLU China and its partners will increase the investment in socioeconomic research and support the advancement of innovative economic modelling to better consider the differentiated welfare effects felt by different income groups and/or rural and urban populations, as well as the potential impacts on job quantity and quality.

6.5 Who to engage

In China, achieving climate neutrality calls for collaboration with a diverse set of stakeholders:

- Government agencies: The State Council is leading a carbon neutrality committee which makes major decisions and coordinates different ministries and agencies.[143] The National Development and Reform Commission (NDRC) plays key roles by developing energy policies and plans. MEE is responsible for developing major climate strategies, policies, plans and for implementing the UNFCCC. MARA focuses on adaptation and mitigation in the agricultural sector.
- Research institutes and think tanks: The National Advisory Committee on Climate Change advises the State Council on scientific and policy issues. The Advisory Committee on National Climate Change Assessment Report, which is hosted by the Ministry of Science and Technology (MOST), provides authoritative scientific evidence for climate change. Other key academic stakeholders include the Chinese Academy of Agricultural Sciences (CAAS), Chinese Academy of Social Sciences (CASS), China Agriculture University, Tsinghua University and Peking University. The Carbon Peaking and Neutrality Research Centre founded by CAAS in 2021 is likely to play a key role in advising MARA.
- NGOs and civil society: The Nature Conservancy (TNC), FOLU's strategic partner, has been working in climate and agriculture issues in China for many years. Its expertise in Nature-based Solutions, climate, soil health and regenerative agriculture can help facilitate the adoption of a food systems approach in the climate sector.

7 Greening China's international soft commodity value chains

7.1 Context

China's challenges and commitments on greening supply chains

The unsustainable production of soft commodities (such as soy, palm oil, beef, timber, paper and pulp) is one of the leading drivers of biodiversity loss, climate change and ecosystem degradation.[144] This has wider implications for food security. Over half of the world's GDP is moderately or highly dependent on nature and its services, and agriculture, food and beverages are among the most highly nature-dependent industries.[145]

As one of the world's largest importers and exporters of soft commodities, China plays a key role in global supply chains.[146] In 2021 China accounted for around 32% of global timber imports, 56% of global soy imports, and 14% of palm oil imports.[147]

China's 14th Five-Year Plan (2021-25) calls for the establishment of a global supply chain risk warning system for important resources and products, and for strengthening international supply chain assurance cooperation.[148] China is developing a national supply chain security evaluation system and starting to pilot it for selected sectors and commodities.

The 14th FYP for High Quality Trade Development also set the agenda on trade development for the period of 2021-2025.[149] For the first time, the plan requires the establishment of green and low-carbon trade standards and certification systems, promotion of international cooperation and mutual recognition of global and domestic green and low-carbon trade principles. China will also explore the establishment of a carbon footprint tracking system for the whole life cycle of trade products.

Following the outbreak of the global pandemic, in April 2020, China's Politburo highlighted the stability of supply chains as one of the "Six Guarantees"– priority areas for economic recovery post COVID-19. Eight ministries and government agencies are developing their strategies for supply chain security and green supply chains, jointly working on innovation and demonstration in China.[150]

Existing actions and initiatives

Global attention on unsustainable supply chains is increasing. More than half of the companies exposed to forest risk and assessed by Supply-Change.Org and Forest 500 have made public commitments to address deforestation (55% and 60%, respectively), with progress in Southeast Asia (palm oil, pulp and paper) more advanced than Latin America (cattle and soy).[151] Firms with a total of USD 8.7 trn in assets under management have committed to eliminating agricultural commodity-driven deforestation from their portfolios by 2025.[152]

A Special Policy Study (SPS) developed between 2019 and 2021 under the China Centre for International Cooperation on Environment and Development (CCICED) focused on pathways and recommendations for greening China's soft commodity supply chains. Co-led by the World Resources Institute and the Foreign Environment and Cooperation Centre of MEE, the study recommended that China adopt regulations requiring due diligence in soft commodity value chains, develop green finance measures, leverage technological advancement related to traceability, use trade policies and promote a circular economy, and set up a technical support system to facilitate these priority actions.[153]

While Chinese companies have been slower to take action on sustainable supply chains than those based in Europe and North America, increased political attention to greening commodity supply chains presents a window of opportunity. China's "Protecting Biodiversity and Building a Global Ecological Civilization" Initiative – announced in October 2021 at the opening of the Convention on Biological Diversity (CBD) COP15 – called for companies to formulate strategies and scientific objectives that will minimize the impact on nature, including developing sustainable value chains and strengthening technological innovation. Chinese businesses that invest overseas are encouraged to promote green supply chains, conduct green procurement and prioritize the purchase of environmentally friendly products and services.[154]

At the UNFCCC COP26 in November 2021, China endorsed the Glasgow Leaders' Declaration on Forests and Sustainable Land Use, committing to strengthen shared efforts to promote sustainable commodity production and consumption.[155] China and the EU have agreed to engage collaboratively in reducing global deforestation, making supply chains more sustainable, and combating illegal logging and associated trade.[156] The US-China Joint Glasgow Declaration on Enhancing Climate Action in the 2020s also includes a commitment to "engage collaboratively in support of eliminating global illegal deforestation through effectively enforcing their respective laws on banning illegal imports".[157]

7.2 Objective and rationale for advancing change

The objective of this workstream is to develop concrete and practical steps to accelerate the greening of China's soft-commodity supply chains. There is a window of opportunity to leverage growing political, business and finance commitments to develop green and forest-positive soft commodity supply chains – both in China and globally – and to build upon the detailed recommendations contained in the CCICED SPS published in 2021. Greening China's international soft commodity supply chains can:

- support global efforts to halt and reverse forest loss and land degradation by 2030 at the latest, and earlier in key biomes, thereby protecting vital ecosystems
- mitigate risks to the global economy, food security and agricultural supply chains
- strengthen China's ecological civilization strategy
- strengthen brand value and market opportunities for Chinese companies by promoting green consumption.

By 2025, our aim is that the foundations are in place for Chinese companies to identify and manage supply chain risks and establish green value chains for soft commodities, including: a national strategy that sets policy goals; an inter-ministerial coordination mechanism and implementation agency; tools, standards and certification schemes to support traceability and due diligence; trade agreements; and innovative financial instruments.

7.3 Proposed approach

Greening soft commodity supply chains requires coordinated, multi-stakeholder action from policymakers, corporates, financial institutions, academia and civil society working across each component of a value chain, from production, supply and procurement to consumption. There are already a number of important policy entry points, a strong set of recommendations developed through the CCICED Special Policy Study (SPS) on Greening Global Supply Chains, and an increased focus on supply chain security and resilience following recent trade, pandemic and conflict-related disruptions.

We will leverage these entry points and combine top-down and bottom-up approaches to drive the development and implementation of integrated strategies. From the policy perspective, an inter-ministerial working mechanism and a national green value chain strategy is needed. Current and relevant supply chain policy instruments can be leveraged to include "green" considerations (e.g. potential environmental and social impact of supply chains) as one of the components. From the private sector perspective, standards, certification and supply chain tools are required that are tailored to the needs and requirements of Chinese companies to strengthen the construction and application of due diligence and traceability systems. At the same time financial institutions and environmental groups need to work together to develop innovative investment and financing models for green value chains and incorporate soft commodity green value chain requirements into the due diligence procedures for the extension of credit or asset investment.

7.4 Proposed actions

To support greening of soft commodity value chains in China, we propose actions in the following four areas:

Ⓐ **Support development of an integrated national strategy and coordination mechanism.** In China, responsibility for soft commodity value chains is distributed across many different ministries, e.g. trade, finance, agriculture, forestry, customs and environment. Relevant inter-ministerial collaborative mechanism models exist (e.g. focused on supply chain innovation and demonstration pilots,[158] or China's national biodiversity conservation[159]). These could be leveraged to develop an overall supply chain strategy with clear objectives, tasks, collaborative mechanisms and responsibilities for each key ministry. FOLU China will provide recommendations and technical support to help establish an integrated green value chain strategy as well as a multi-stakeholder mechanism, drawing on recommendations of the SPS report as well as wider international experience. Such a mechanism will review and approve the green value chain strategy, policies, plans and roadmaps, and organize and coordinate among members to advance work tasks. We will support the Foreign Environment Cooperation Centre (FECO) to set up a Global Green Supply Chain Institute to serve as the core technical support body on supply chain issues under MEE and encourage engagement by more government agencies and other stakeholders. FOLU China will help play a bridging role to connect the institute with other Chinese and international stakeholders - think tanks, industrial associations, research institutes, international organizations and NGOs. We will also share experiences and best practices from other countries and regions, such as the EU, and the US, where there are established laws, policies and strategies on green supply chains.

Ⓑ **Strengthen existing policy priorities and instruments.** FOLU China will provide technical support, research and recommendations to improve methodologies, strengthen benchmarking of trade-related standards, design strategies that incorporate social and environmental considerations, establish a carbon footprint assessment system and leverage bilateral and multilateral trade agreements. Specific opportunities include: the 14th FYP for Agriculture Green Development, which requires the establishment of a traceability system for agricultural product supply chains; the BRI Green Supply Chain Index,[160] co-developed by WRI China and the BRI Green Coalition (BRIGC) of MEE, which helps decision-makers know what level of due diligence and due care they should take when investing in soft commodity projects or entering into sourcing contracts; the design of pilots at sectoral and company levels and scaling up pilots to incorporate more commodities into a long-term mechanism; establishment of a standards and certified system for green trade as well as the carbon footprint tracking system of trade products; incorporation of measures to include green soft commodity imports into bilateral and multilateral trade agreements; and international collaboration through Asia-Pacific Economic Cooperation (APEC), the Regional Comprehensive Economic Partnership (RCEP) and the Forest, Agriculture and Commodity Trade (FACT) Dialogue.

Ⓒ **Strengthen due diligence and traceability systems.** China has already issued detailed guidance on the role of governments and companies in establishing traceability systems for certain products. It also has valuable experience in sectors such as meat and vegetables, alcoholic products, drugs and herbal medicines that can be applied to soft commodities. UK and EU experience in developing due diligence frameworks can also be drawn upon. FOLU China will work together with Chinese business associations to benchmark global and Chinese standards for sustainable soft commodities,

develop sustainable procurement guidelines and standards and pilot these with member companies, drawing on widely adopted supply chain management tools such as Global Forest Watch and the Accountability Framework Initiative. We will provide recommendations on international best practices, raise awareness and conduct capacity building to help Chinese companies understand the benefits of sustainable soft commodities supply chains, the differences between existing standards and the data and tools that can be used to evaluate the social and environmental impacts of their procurement.

Ⓓ **Integrate finance for green soft commodity value chains into green finance.** Agencies that regulate the finance sector in China can encourage financial institutions to support companies in greening their supply chains. This can include innovations in trade finance, safeguards on investments in infrastructure projects and commodity processing facilities, and grants or loans to producer countries to support the transition to greener production systems and related monitoring, reporting, and verification of progress. The central economic work conference of China has called for an increase in finance support to green development and to strengthen supply chain resilience.[161] However, due to the complexity of green supply chains, trade and agriculture, only a few cases and practices have so far been conducted by financial institutions (e.g. the Industrial Bank, HSBC, China Construction Bank).

7.5 Who to engage

In China, responsibility for soft commodity value chains sits across the following ministries:

- Ministry of Commerce (supply chain security and trade)
- Ministry of Ecology and Environment (green BRI supply chain and biodiversity)
- Ministry of Agriculture and Rural Affairs (agriculture supply chain and biodiversity)
- National Forestry and Grassland Administration (forest legality)
- China Banking and Insurance Regulatory Commission (green finance)
- China International Development Cooperation Agency (CIDCA) (China's south-south cooperation and assistance)

Key research institutes include:

- China Academy of Sciences
- University of International Business and Economics

The following business associations, companies and financial institutions are also key:

- China Chamber of Commerce of Import & Export of Foodstuffs
- Native Produce & Animal By-Products
- China Timber & Wood Products Distribution Association
- COFCO
- China Development Bank
- Export-Import Bank of China
- Bank of China, Asian Infrastructure Investment Bank
- Industrial and Commercial Bank of China
- Agricultural Bank of China.

Relevant NGOs and civil society include:

- WRI China
- Partnership on Biodiversity and Finance
- TFA
- TNC
- GEI
- CDP

8 Conclusion

China's food systems play a vital role in feeding its population and providing livelihoods to hundreds of millions of its farmers and food sector workers. Greater accessibility and affordability of food, together with enormous improvements in living standards, have also contributed to huge changes in Chinese diets, but these have implications for human and planetary health. As the leading importer of meat and dairy products, feedstock and oils, China has a key role to play in supporting a shift to green value chains and green consumption to protect the vital natural ecosystems which underpin the global economy.

China has already embarked on an ambitious reform agenda which will reshape global food and land use systems in the decades to come. Policies, investments and innovations will significantly alter how food is produced, and influence what people consume. China is well-placed to absorb and learn from best practices abroad, adapt these to its national and local context, and share its experience and learning with other countries.

FOLU China can play an important bridging role, helping to break down institutional and disciplinary silos to design and implement system-level strategies. As part of a broader global knowledge and communications network, FOLU China can help connect domestic and international experts and share China's experience with other countries to accelerate learning.

This Action Agenda has identified five strategic priorities to help China focus its efforts in the coming years: healthy and sustainable diets; sustainable and regenerative agriculture; reducing food loss and waste; integrating food and land use into China's carbon neutrality strategies; and greening China's international soft commodity value chains. In addition to accelerating action under each strategic priority, FOLU's efforts will focus on identifying the synergies, as well as potential trade-offs, between different policy objectives. This will help design strategies that minimize trade-offs in order to maximize public goods. For example, carbon neutrality strategies need to consider socioeconomic impacts on rural livelihoods as well as the need to reverse soil degradation. Food affordability and availability – key factors in healthy and sustainable diets – will be shaped by agriculture and trade policies.

FOLU China will also mobilize its network to develop and disseminate cross-cutting analysis that supports systems-level thinking and science-based approaches.

China's strong institutional capacity, world leading research community and vibrant agri-food sector are all strong foundations upon which to build sustainable, resilient food and land use systems that address the key challenges of our present era and meet the needs of future generations.

Annex A: Methodology

This Action Agenda builds upon more than three years of research, action and consultations with stakeholders in China and internationally. While not a research product in itself, it does have a solid empirical foundation. An overarching context section at the beginning of the report presents a macro level overview of food and land use systems in China, while the context sections in each chapter go into some depth on the particular topic therein.

① Literature review

The Action Agenda was based on a literature review on the following topics: land use, food production and consumption, agriculture and environment, nature conservation and restoration, agrarian livelihood systems, marine and freshwater resources, food consumption, diets and health, food loss and waste, and trade and supply chains. We have drawn from a wide range of published research and analysis as inputs to the Action Agenda, with a particular focus on the five areas covered in separate chapters of this document: healthy and sustainable diets, sustainable and regenerative agriculture, food loss and waste, greening soft commodity supply chains and integrating food and land use into China's climate neutrality strategies.

All of these topics were chosen first and foremost because they are high priorities for FOLU globally (four out of the five topics are current FOLU global objectives), and the FOLU Action Agendas need to reflect our global priorities. Furthermore, they align with China's own domestic priorities. For instance, China has recently adopted an Anti-Food Waste Law and has a Clean Your Plate Campaign, which is receiving strong official backing. China is very concerned about the security and reliability of food supply chains, and we believe that the sustainability of these supply chains is important as well. On agriculture, China is promoting research on ecological farms and it is official policy to encourage crop rotations and circular systems of farming. Healthy and balanced diets are a high priority for the government as well; we believe that sustainable diets are needed as well as healthy ones. China has an official target to achieve peak carbon by 2030 and carbon neutrality by 2060.

Extensive use was made of FAO datasets, as well as publicly available Chinese government documents. In addition to published articles, papers and books, grey literature and unpublished papers have also provided valuable reference materials. Three commissioned papers were particularly important in providing background information: 1) a China Food and Land Use Diagnostic produced by FOLU intern Nayha Patel and members of the FOLU China team in August 2020; 2) a background paper on Agriculture and Rural Development in China, by Ning Dai and Zhenzhong Si of the University of Waterloo, produced in September 2020; and 3) a background paper on Recent Chinese Environmental Governance Reforms produced by Lila Buckley of IIED in September 2020.

② Stakeholder engagement

The FOLU China platform has convened over 60 meetings and consultations with stakeholders in China and internationally since 2019. These include large meetings, small group meetings and many individual meetings with key stakeholders. Where meetings focused on a particular topic, such as healthy diets or climate neutrality, the stakeholders selected were all experts or key influencers in that topic. Where meetings covered a wider range of topics, the participants were selected because of their expertise in a particular topic of relevance to the meeting. Efforts were made to engage experts with a wide variety of views, as well as to include different types of stakeholders, including from academe, civil society, government agencies and the private sector. The FOLU China partners have also met on a regular basis since 2019, and their inputs have been crucial in developing this Action Agenda. In addition, several workstreams such as healthy diets and greening supply chains – which have generated papers for publication – included several rounds of stakeholder consultations as part of the work process.

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